8-2018

Renewable Hydrogen Conference

Department of Primary Industries and Regional Development, Western Australia

Department of
Primary Industries and Regional Development

GOVERNMENT OF WESTERN AUSTRALIA

Renewable Hydrogen Conference

Friday, 31 August 2018
Perth, Western Australia

Contents

Renewable Hydrogen Conference, Perth

Welcome

Message from the Minister

The Western Australian State Government welcomes you to Perth and to the Renewable Hydrogen Conference.

As the world continues its transition to a low-emissions future, it is increasingly apparent that hydrogen will play an important role, complementing other technologies in a future energy mix.

We are seeing key markets around the world developing hydrogen-based economies. Today we will learn more about those plans and the opportunities they create for Western Australia, and Australia more broadly. We note it offers the prospect of new industry in regional Western Australia.

We are particularly pleased to welcome Dr Alan Finkel AO, Australia's Chief Scientist, to the Conference. Dr Finkel has recently presented a paper on hydrogen to the Council of Australian Governments, and so is well placed to guide our consideration of the opportunities. Today we will also hear from CSIRO on their recently launched 'National Hydrogen Roadmap', and from ARENA on its report into hydrogen export opportunities.

Establishing supply chains, improving technology, scaling-up renewable energy production, and improving hydrogen's commercial competitiveness are important processes driven by industry. Today we will hear presentations from a range of leaders in the hydrogen industry sharing recent developments and future plans.

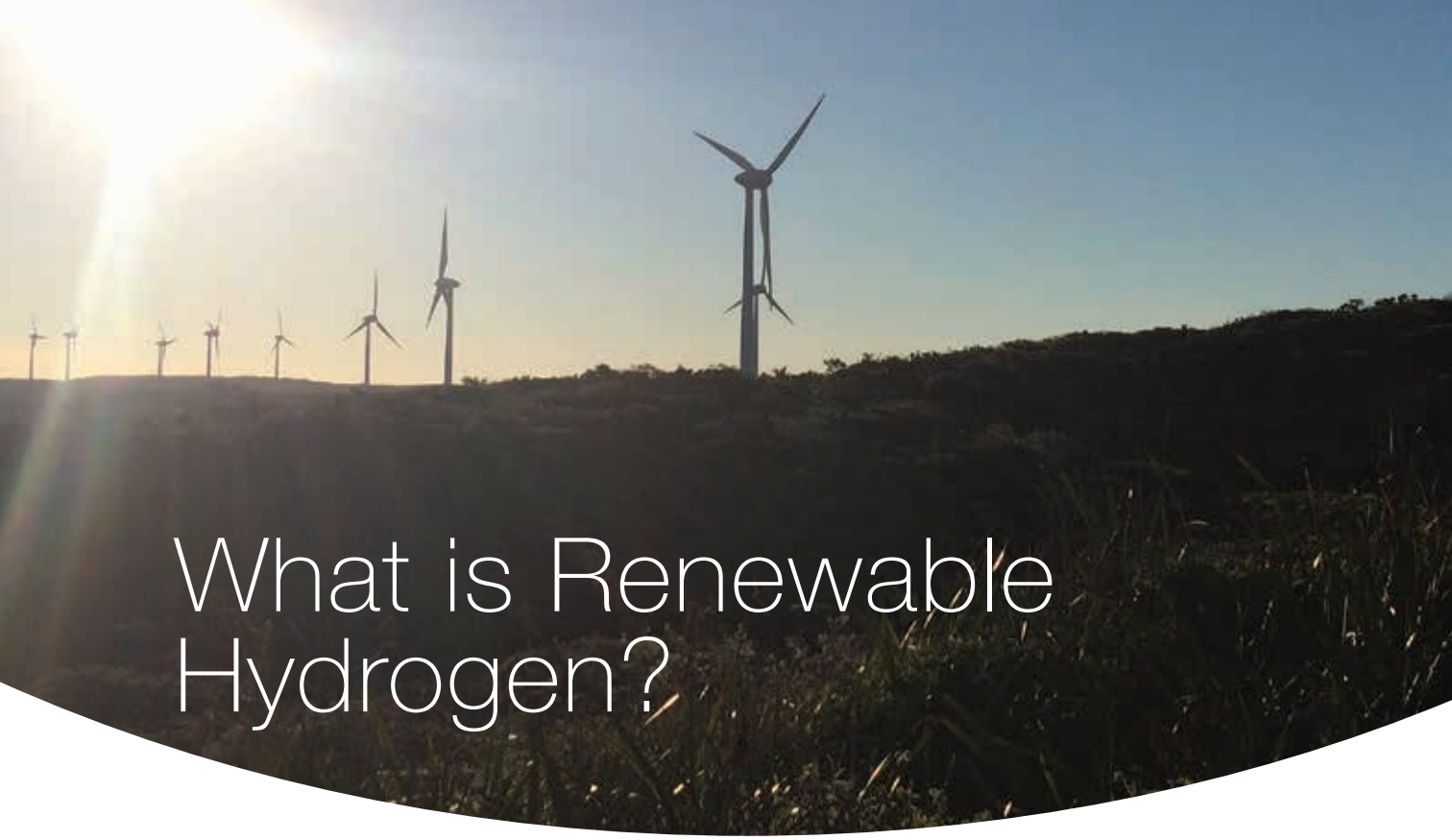
This Renewable Hydrogen Conference has attracted widespread interest, and presenters of a high calibre.

The time for a robust and informed conversation about the future of the hydrogen industry is now.

I hope you have an enjoyable and informative day.

Hon. Alannah MacTiernan MLC

MINISTER FOR REGIONAL DEVELOPMENT;
AGRICULTURE AND FOOD



What is Renewable Hydrogen?

As a fuel, **hydrogen can be used in similar ways to natural gas**. In simple terms, it can be burned, used to create electricity, or stored for future energy generation.

Most of the hydrogen produced today comes from heavy industrial processes using fossil fuels. However, hydrogen can also be produced by electrolysis, where an electrical current is passed though water to separate the hydrogen and oxygen.

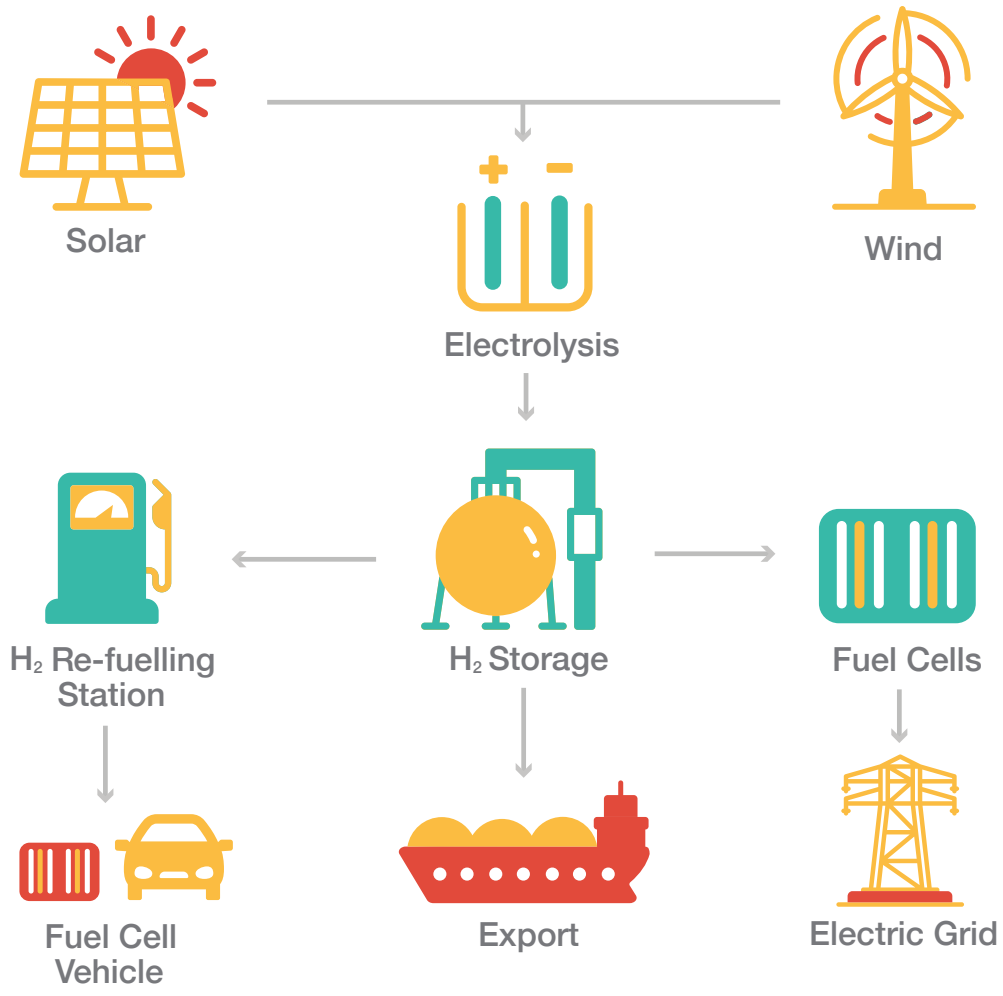
$$2H_2O \rightarrow 2H_2 + O_2$$

Where the electricity used in the electrolysis process comes from renewable energy sources, the hydrogen produced is termed renewable hydrogen.

Despite hydrogen's association with heavy industry and fossil fuels, the growing global interest in de-carbonisation and the declining cost of renewable energy means renewable hydrogen is becoming increasingly explored for use in:

- Transport
- Fertiliser
- Storage
- For blending with, or as a replacement to, natural gas
- Power generation

Leading economies such as Japan and Korea are also progressing with hydrogen plans as part of their drive towards a zero carbon economy.



Infographic courtesy Key2Graphics

Western Australia and Renewable Hydrogen

Some of the **key requirements for production of renewable hydrogen** are large-scale availability of **renewable energy generation**, access to water and access to a market.

World class renewable energy resources

Western Australia is recognised globally as offering some of the world's best renewable energy resources.

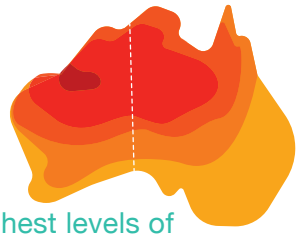
It has five diverse climate zones, with opportunities across the state for solar, wind and other emerging renewable technologies such as wave energy.

Australia has the highest average solar irradiance per square metre of any continent in the world, with Western Australia's northern regions the best in the country. Solar irradiance in Western Australia has been recorded at levels as high as 2,300 kWh per square metre, per year at Telfer in the Pilbara region.

2.5 million km²
That's **1/3 of the continent**

5 diverse **climate zones**

Western Australia's mid and southern regions also offer some of the country's greatest potential for wind generation, with good wind resources extending hundreds of kilometres inland. Capacity factors for the wind turbines in the region are over 45% which is world class. There are more than 400MW of wind projects in the pipeline for the Mid West region.



WA has the highest levels of **solar irradiance in Australia**, peaking in its **northern regions.**

WA's mid and southern regions offer some of the country's greatest potential for **wind generation.**

Infographics courtesy Key2Graphics

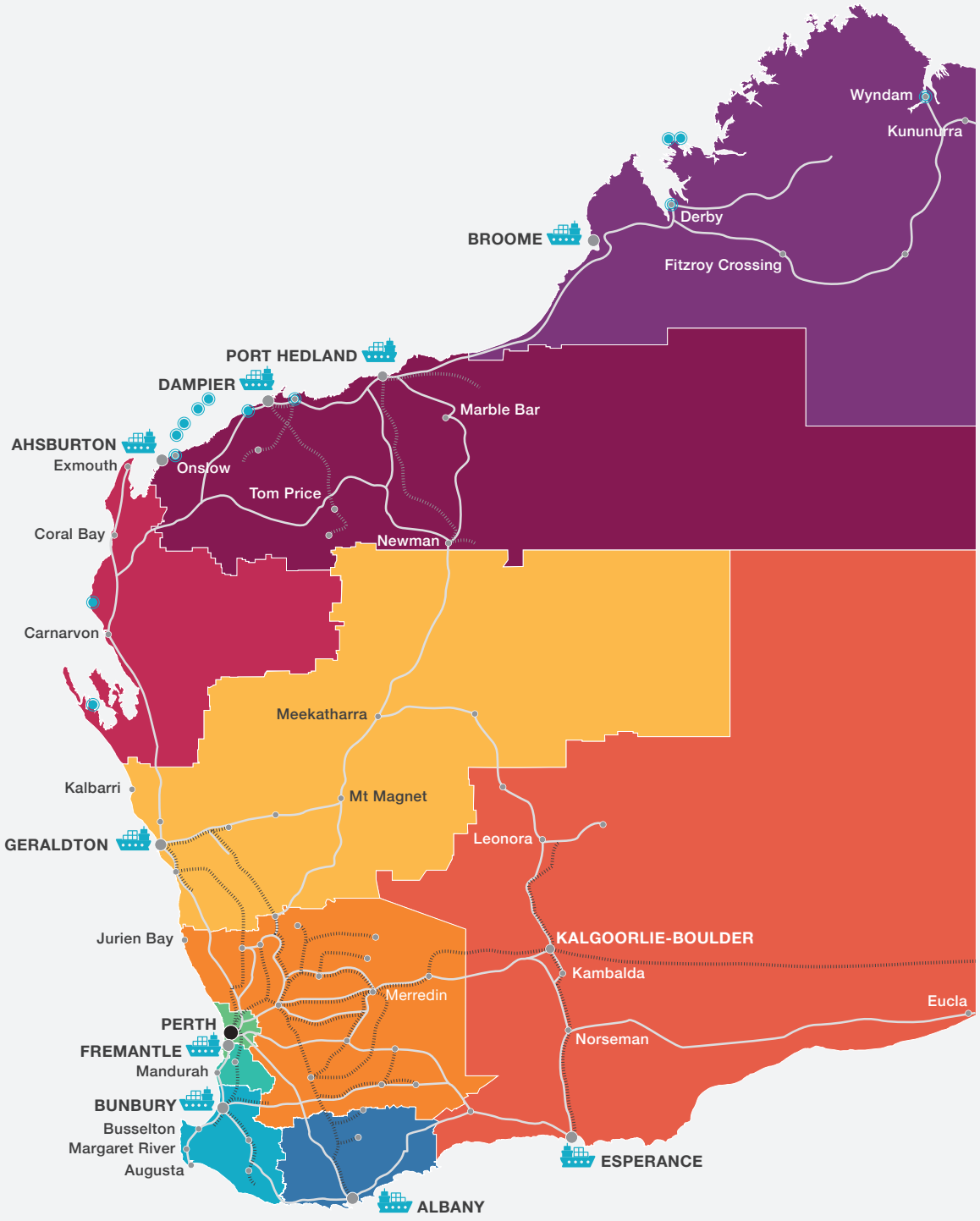


Diagram courtesy Key2Graphics

Access to markets

Ideally positioned for access to strategically significant growth markets throughout Asia, Western Australia is a gateway to some of the world's most dynamic and emerging economies.

Western Australia boasts an open and stable economy, built on robust international trade and investment. Our strong economic relationship with Asia, Middle East, Europe and the US has delivered more than 20 years of sustained growth.

Australia's export volumes have increased as the strong inflow of foreign investment over the past decade has begun translating into new production capacity. The growth is expected to continue as Australia now has 10 Free Trade Agreements in place, covering 67% of Australia's total trade.

These include key Asia Pacific locations such as Japan and Korea where there is a growing demand for hydrogen, as well as other locations including Singapore and China.

WA has the nation's **largest network of ports**

Western Australia has a long history of delivering energy and resources to the world, with established infrastructure and supply chains.

The state is also home to the country's largest network of ports.

A globally-connected state, Western Australia shares the same time zone (of plus or minus two hours) with 60% of the world's population.

Western Australia shares the same time zone with:

- Singapore
- Hong Kong
- Shanghai

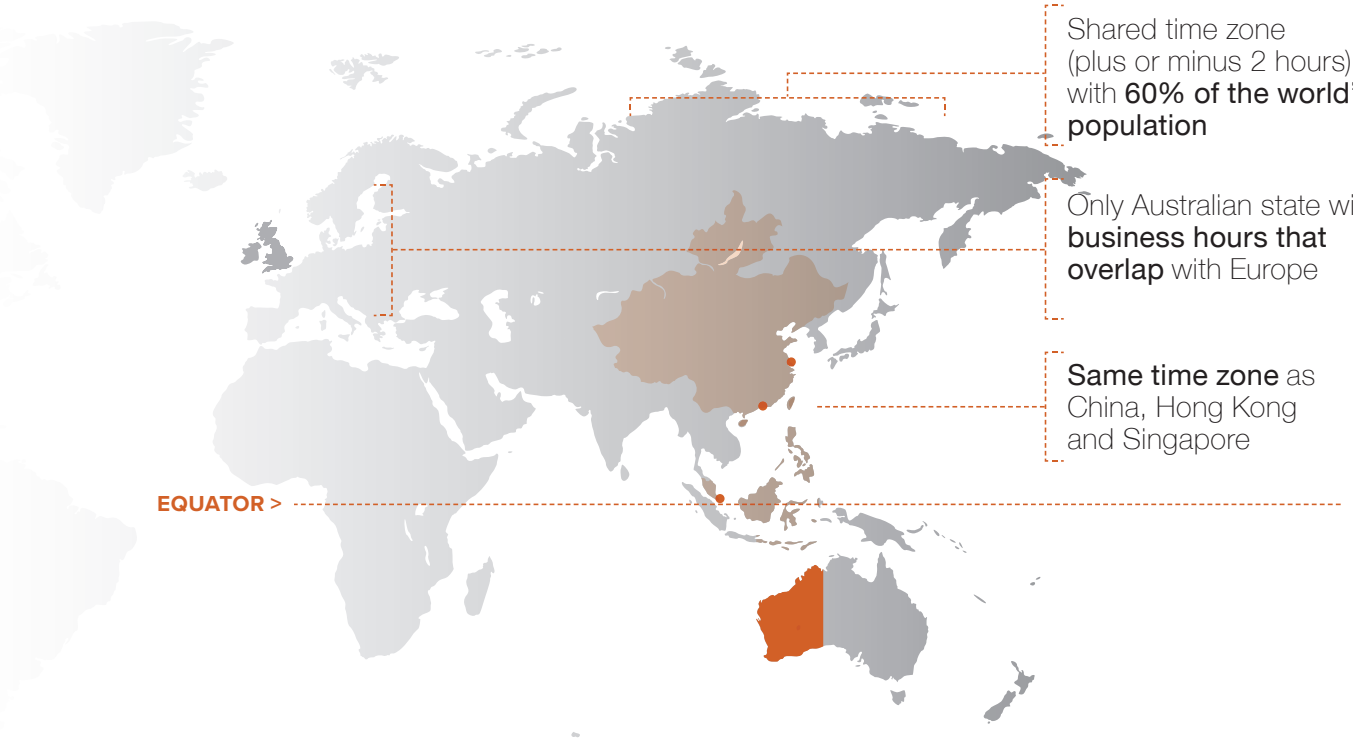
And is within one hour of:

- Tokyo
- Seoul

Western Australia's location, strong links with Asia and preferential market access via Australia's Free Trade Agreements, combined with its renewable energy resources and significant gas infrastructure, place the State in a unique position to capitalise on the growing renewable hydrogen market.

10 **free trade** agreements

60% of the world's population **in same time zone** as WA


Shared time zone (plus or minus 2 hours) with **60% of the world's population**
Only Australian state with **business hours that overlap** with Europe
Same time zone as China, Hong Kong and Singapore
EQUATOR >

Conference Program

8.45 am	**REGISTRATION**	
9.30 am	**OPENING AND KEYNOTE ADDRESS**	
The Renewable Hydrogen Opportunity for Western Australia	**Hon. Alannah MacTiernan MLC** Minister for Regional Development; Agriculture and Food	
Western Australia: The Energy State	**Hon. Mark McGowan MLA** Premier of Western Australia	
Hydrogen in Australia's Future	**Dr Alan Finkel AO** Australia's Chief Scientist	
Kick-starting the Hydrogen Economy in Australia	**Ben Wilson** Chief Executive Officer, Australian Gas Infrastructure Group	
11.00 am	**MORNING TEA**	
11.15 am	**MARKETS AND ECONOMICS — INTERNATIONAL VISION**	
A Systemic Approach Towards a World Hydrogen Economy	**Michèle Azalbert** Chief Executive Officer, Renewable Hydrogen Business Unit, ENGIE	
Hydrogen Supply Chains for a Sustainable Future	**Dr Motohiko Nishimura** Associate Officer, Deputy General Manager, Hydrogen Project Development Centre, Corporate Technology Division, Kawasaki Heavy Industries Ltd	
Implementation Plan of Hydrogen Economy in Korea	**Jin-Nam Park** Associate Professor, School of New and Renewable Energy, Kyungil University	
12.00 pm	**MARKETS AND ECONOMICS — AUSTRALIAN PERSPECTIVES**	
National Hydrogen Roadmap Presentation	**Dr Patrick Hartley** Director, Hydrogen Energy Systems Future Science Platform, CSIRO	
Australia's Opportunities from Hydrogen Exports	**Tom Campey** General Manager, Strategy, ARENA	
12.45 pm	**LUNCH — Sponsored by ENGIE**	

1.30 pm	HYDROGEN IN ACTION	
	Introduction	**Ralph Addis** Director General, Department of Primary Industries and Regional Development
	ATCO's Clean Energy Innovation Hub	**Steve Lewis** General Manager, Business Development, ATCO
	Blue Hydrogen as a Transition to Green	**Shannon O'Rourke** Head of Commercialisation, Woodside
	Integrating Renewable Energy and Hydrogen Production	**Murray Lyster** Head of Hydrogen Solutions, Siemens
	Green Hydrogen in Ammonia Production	**Chris Rijksen** General Manager, Yara Pilbara
	PANEL: Q&A	
2.45 pm	**AFTERNOON TEA**	
3.00 pm	**HYDROGEN IN THE TRANSPORT INDUSTRY**	
	Australia's Transition to Hydrogen Mobility	**Claire Johnson** Chief Executive Officer, Hydrogen Mobility Australia
	Toyota Australia – Fuel Cell Future	**Matt Macleod** Manager, Advanced Technology Vehicles and Site Development, Toyota Motor Corporation
	Future of Hydrogen Mobility is Now	**Scott Nargar** Manager, Hyundai Future Mobility and Government Relations, Hyundai Motor Company
3.25 pm	**PURSUING A RENEWABLE HYDROGEN VISION FOR AUSTRALIA**	
	PANEL: Q&A	

Panel members:

Hon. Alannah MacTiernan MLC Minister for Regional Development; Agriculture and Food
Dr Alan Finkel AO Australia's Chief Scientist
Michèle Azalbert Chief Executive Officer, Renewable Hydrogen Business Unit, ENGIE
Ian Kay Chief Financial Officer, ARENA
Shaun Gregory Executive Vice President Exploration and Chief Technology Officer, Woodside
Claire Johnson Chief Executive Officer, Hydrogen Mobility Australia

4.15 pm	**CLOSING ADDRESS**	**— Hon. Alannah MacTiernan MLC, Minister for Regional Development; Agriculture and Food**
4.30 pm	**NETWORKING EVENT**	**— Sponsored by ANT Energy Solutions**

Keynote Speakers

Hon. Alannah MacTiernan MLC

MINISTER FOR REGIONAL DEVELOPMENT; AGRICULTURE AND FOOD

The Minister has had 30 years in public office, in local government and State and Federal Parliament.

She was the Minister for Planning and Infrastructure from 2001 to 2008 responsible for major rail, road, port and development projects across Western Australia.

After serving as Mayor of the City of Vincent in inner Perth and serving a term as Federal Member for Perth, she returned to the State Parliament in 2017 and is currently the Minister for Regional Development; Agriculture and Food and the Minister Assisting the Minister for State Development, Jobs and Trade.

The Minister is committed to creating sustainable economic opportunity in Western Australia's regional areas through fostering strong partnerships with industry and with a focus on science and innovation.

Hon. Mark McGowan MLA

PREMIER OF WESTERN AUSTRALIA

The Honourable Mark McGowan MLA is the 30th Premier of Western Australia.

Under his leadership the State Government is focused on creating and securing jobs for Western Australians, delivering quality education and health care and delivering the METRONET public transport vision.

In the McGowan Labor Government's first year in office, Mr McGowan has introduced significant reforms such as amalgamating government departments from 41 to 25 to drive change across the public sector. He has also driven State-wide job creating initiatives such as Infrastructure WA, which sets out a new approach to long term infrastructure planning and WA Industry Link — to give WA businesses more opportunities to tender and apply for government work.

Mr McGowan began his career in public service in the Royal Australian Navy, and served as a Lieutenant at HMAS STIRLING Naval Base. He was elected to the Legislative Assembly in 1996 representing the seat of Rockingham.

Mr McGowan has served as Parliamentary Secretary to former Premier Geoff Gallop and has served as a Minister in the portfolios of Education and Training, Environment, Racing and Gaming, Tourism and South West. Across each portfolio he has brought about lasting change through key policy initiatives.

Mr McGowan holds a degree in arts and law from the University of Queensland.

Mr McGowan was awarded a Governor General's Commendation for Bravery for actions he took in 1995 rescuing an unconscious driver from a burning car.

Hard work and merit are key principles Mr McGowan believes in. These are supported by the strong values of equality, opportunity and compassion.

Dr Alan Finkel AO

AUSTRALIA'S CHIEF SCIENTIST

Dr Finkel commenced as Australia's Chief Scientist on 25 January 2016. He is Australia's eighth Chief Scientist. Prior to becoming Chief Scientist, he was the eighth Chancellor of Monash University and the eighth President of the Australian Academy of Technology and Engineering (ATSE).

Since commencing as Chief Scientist, Dr Finkel has led a number of national reviews, delivering the 2016 National Research Infrastructure Roadmap, the 2017 Review into the National Electricity Market ('Finkel Review') and the 2018 STEM Industry Partnership Forum report. He serves as the Deputy Chair of Innovation and Science Australia.

Dr Finkel has an extensive science background as an entrepreneur, engineer, neuroscientist and educator. He was awarded his PhD in electrical engineering from Monash University and worked as a postdoctoral research fellow in neuroscience at the Australian National University.

In 1983 he founded Axon Instruments, a California-based, ASX-listed company that made precision scientific instruments. After Axon was sold in 2004, Dr Finkel became a director of the acquiring company.

In 2006, he focused his career in Australia and undertook a wide range of activities including co-founding Cosmos Magazine. During his time at ATSE, he led the development and implementation of the STELR program for secondary school science.

Ben Wilson

CHIEF EXECUTIVE OFFICER, AUSTRALIAN GAS INFRASTRUCTURE GROUP

Ben Wilson is Chief Executive Officer of Australian Gas Infrastructure Group (AGIG) which includes the Dampier Bunbury Pipeline (DBP), Multinet Gas (MG), and Australian Gas Networks (AGN).

Together these assets make AGIG one of Australia's largest gas infrastructure businesses, active nationwide, with around 2 million distribution customers, more than 3,500 km of transmission pipelines, 34,000 km of distribution networks, and 42 petajoules of gas storage capacity. Ben became CEO of AGN in 2015 and of DBP and MG in 2017.

Previously, Ben was the Director of Strategy and Regulation and Chief Financial Officer at UK Power Networks (UKPN), a large electricity distribution company in the UK with 8 million customers. At UKPN Ben's responsibilities included negotiating UKPN's 2015-2023 price control under Ofgem's RIIO framework, and UKPN's Business Transformation Program. Before joining UKPN in 2011 Ben was a utilities investment banker for fifteen years, working in Europe, Asia and Latin America, most recently at Deutsche Bank.

Ben is a Director of Energy Networks Australia (ENA) and is Chairman of the ENA's Gas Committee.

Conference Presenters

Michèle Azalbert

CHIEF EXECUTIVE OFFICER, RENEWABLE HYDROGEN BUSINESS UNIT, ENGIE

Michèle Azalbert is Chief Executive Officer of ENGIE's Renewable Hydrogen Business Unit.

Michèle has previously assumed various responsibilities in the sectors of treasury, financing and risk management with Elf Aquitaine from 1992 to 1996, Sanofi from 1996 to 1999 and Suez from 1999 to 2005. She was appointed Head of Treasury & Risk Management of the Suez Group in 2005 followed by Chief Executive Officer of Gaselys in 2008.

In 2011 Michèle moved to ENGIE Global Market (previously GDF SUEZ Trading) as Executive Vice President where she was responsible for support functions. In 2013 she was appointed to the position of Chief Operating Officer of ENGIE's Global LNG BU, in charge of Supply and Trading.

On the 1st of January 2018, Michèle Azalbert became CEO of a new business unit committed to massively developing ENGIE's positions on renewable hydrogen, from production to end-uses, on a global scale.

Michèle holds a Computer Science Engineering degree and graduated in Business Administration at HEC Paris.

Dr Motohiko Nishimura

ASSOCIATE OFFICER, DEPUTY GENERAL MANAGER, HYDROGEN PROJECT DEVELOPMENT CENTRE, CORPORATE TECHNOLOGY DIVISION, KAWASAKI HEAVY INDUSTRIES LTD

Dr Nishimura heads-up hydrogen development activities for Kawasaki Heavy Industries (KHI) and is one of the main brains and drivers behind the Hydrogen Energy Supply Chain (HESC) Project, which aims to convert Australian brown coal into liquefied hydrogen for export to Japan.

He has a long history with KHI since 1987, having worked in engineering and development of power and energy plant systems, thermal hydraulics and combustion engineering. He has held Senior Manager positions in the Thermal Technology and Hydrogen Project Departments.

Dr Nishimura has been working in the current position since 2015. He has played an active role in hydrogen policy development in Japan and has been engaging key stakeholders in industry, academia and government globally.

He often presents in international conferences and has published a number of technical papers.

He holds a PhD from Tokyo Institute of Technology.

Jin-Nam Park

ASSOCIATE PROFESSOR, SCHOOL OF NEW & RENEWABLE ENERGY, KYUNGIL UNIVERSITY, SOUTH KOREA

Jin-Nam Park is an Associate Professor at the School of New & Renewable Energy in Kyungil University, South Korea.

Currently, he serves as a committee member on the IEC technical committee for Fuel Cell Technologies, is the Secretary General of the Korean Hydrogen and New Energy Society, and is the Chair of working group in H2Korea. Previously, he worked in the Refinery division for Hanwha Energy and he worked as post-doc at the Korean Research Institute of Chemical Technology and the University of Waterloo, Ontario, Canada. Previously he was a Principal Researcher in LG Chem.

His main research fields are fuel cell and hydrogen energy.

Prof. Park graduated from the Department of Chemical Technology in Seoul National University and has a Bachelor of Science and Ph.D.

Dr Patrick Hartley

DIRECTOR, HYDROGEN ENERGY SYSTEMS FUTURE SCIENCE PLATFORM, CSIRO

Dr. Patrick Hartley is the Director of CSIRO's Hydrogen Energy Systems Future Science Platform. This $13.5M initiative was recently established to catalyse hydrogen energy innovation across CSIRO and its partners in order to realize science and technology opportunities across the hydrogen energy value chain.

Prior to this, he led the Oil, Gas and Fuels research program within CSIRO's Energy Business Unit. The program comprises 85 research staff and students working on applied research projects which span the energy resources value chain, with a particular emphasis on the sustainable development of Australia's petroleum resources and on the associated challenges of large scale carbon dioxide storage.

Patrick graduated with a PhD in Chemical Engineering from Imperial College, London in 1994, and was subsequently awarded a research fellowship from the Royal Society, London, which allowed him to take up full time research fellowship roles at the University of Melbourne. He joined CSIRO as a research scientist in 1994. Since joining CSIRO, he has led research teams working with national and international large corporations and SME's to develop new technologies for applications in drug delivery, energy storage, water treatment and petrochemical recovery. Patrick has occupied senior research management roles in CSIRO since 2006. He is a Graduate of the Australian Institute of Company Directors and holds an Adjunct Professorship at RMIT University in Melbourne, Australia.

Tom Campey

GENERAL MANAGER, STRATEGY, ARENA

Tom Campey is the General Manager, Strategy, at ARENA. In this role he helps ARENA decide where to focus its financial assistance and related efforts to best achieve ARENA's objectives.

Prior to ARENA, Tom worked at CSIRO, where he led a project to develop a roadmap for low emissions technologies in Australia. Before CSIRO, Tom spent five years at McKinsey & Company, focused mainly on strategy, serving clients in a wide range of industries including energy, mining, banking and retail.

Tom holds a Bachelor of Engineering (Mechanical and Space), a Bachelor of Science (Physics) and a PhD (Physics) from the University of Queensland.

Ralph Addis

DIRECTOR GENERAL, DEPARTMENT OF PRIMARY INDUSTRIES AND REGIONAL DEVELOPMENT

Ralph Addis brings a wealth of experience from the private, not-for-profit and government sectors. He has a natural affinity for regional Western Australia having grown up on a farm at Cranbrook and spent much of his working life in Kununurra.

Ralph was Chair of the Kimberley Development Commission for more than two years and has held a range of commercial, not-for-profit and local government board positions. He was most recently Director General at the Department of Regional Development where he drove an outcomes-based approach with a focus on jobs and economic growth.

Ralph is a Chartered Accountant, holds a degree in Commerce, a Master of Agricultural Economics and is a graduate member of the Australian Institute of Company Directors.

Steve Lewis

GENERAL MANAGER, BUSINESS DEVELOPMENT, ATCO AUSTRALIA

Steve Lewis commenced his role at ATCO Australia in October 2015, having spent the previous five years with Australian gas pipeline owner the APA Group, and prior to that more than a decade with Woodside Energy.

An experienced and customer focused manager, Steve is responsible for identifying and delivering on growth opportunities utilising ATCO's wide ranging expertise across the energy infrastructure value chain.

Steve holds a Bachelor of Applied Science and a Graduate Diploma in Business Administration.

Shannon O'Rourke

HEAD OF COMMERCIALISATION, WOODSIDE

Shannon O'Rourke is the Head of Commercialisation for Woodside Energy.

Shannon has over 20 years in the energy and resources industry. In his ten years with Woodside he has orchestrated innovations across hydrogen, carbon, batteries, LNG fuels, Burrup Repower and within drilling.

He has worked as VP Corporate Strategy, Executive Adviser and as a Senior Drilling Engineer. He held previous roles with Chevron, Diamond Offshore and Rio Tinto across design, operations and research.

Shannon is a graduate of the Harvard General Management program, holds an MBA with Distinction from Manchester University, and Bachelors of Engineering (Hons) and Commerce from the University of Western Australia.

Murray Lyster

GENERAL MANAGER – MINING SOLUTIONS, HEAD OF HYDROGEN SOLUTIONS, SIEMENS

Murray Lyster has been with Siemens Australia for 20 years holding various senior positions within the Process Industries and Drives Division. He has a Bachelor of Technology degree (UTS, Sydney), and a Master of Business Administration (Deakin University). He is currently the General Manager of Mining Solutions, Head of Hydrogen Solutions.

For most of Murray's career, he has worked in the mining sector, assisting companies implement innovative technological solutions and has become focused on how "Digitalisation / Industry 4.0" and renewable energy can be applied to the mining sector to provide productivity, reduced costs and comparative advantage to customers.

Hydrogen is a new and exciting portfolio for Siemens. In Murray's view, hydrogen has a huge role to play from mobility, to re-electrification and decarbonising gas networks.

Murray is a passionate advocate of hydrogen technology and regularly bores his family with how exciting and interesting hydrogen is in the changing energy mix.

ENGIE

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What if the future of cities was invented on a boat?

Project no. 32. Key player for renewable energies in France*, ENGIE supports Energy Observer, the first ship powered by renewable energies and hydrogen produced on board.
A real laboratory for future energies, which achieves on water what ENGIE does on land to make territories autonomous, to contribute to a more harmonious progress.
Discover more collaborative projects at **harmonyproject.engie.com**

#ENGIEHarmonyProject

*Based on a comparison of the production capacities of solar energy in France (31/12/2017) https://www.engie.com/businesses/electricity/solar-energy

Chris Rijksen

GENERAL MANAGER, YARA PILBARA

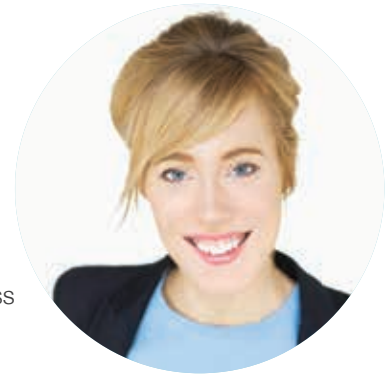
Chris Rijksen has been the General Manager of Yara International's Pilbara Ammonia and Technical Ammonium Nitrate operations in Karratha (Western Australia) since January 2017.

Previously Chris was Yara's Technical Process Owner for Maintenance and Inspection for six years in Belgium, responsible for all technical maintenance disciplines and inspection strategy, development and support for Yara production worldwide.

From 2006 to 2010, Chris oversaw a workforce of 150 maintenance employees at Yara Sluiskil in the Netherlands with responsibility for daily maintenance, shutdowns and modification projects.

Chris was also the Energy and Development Manager at Sluiskil, heading up the implementation of emission monitoring and trading. Prior to this, he was Sluiskil's Deputy Production Manager across two nitric acid plants, three power plants and four water production plants and managed the construction of a new power plant and HV distribution grid.

Chris has a Masters in Electrical and Control Technics from the Eindhoven University of Technology (Netherlands) and a Bachelor in Electrical Energy Systems and Control Technics from Hogeschool Zeeland (Netherlands).



Claire Johnson

CHIEF EXECUTIVE OFFICER, HYDROGEN MOBILITY AUSTRALIA

Claire Johnson is the Chief Executive Officer of Hydrogen Mobility Australia, an industry association representing Australia's emerging hydrogen industry.

Claire has extensive experience in policy development and government relations across the private and public sectors, including her previous position as Government Liaison Manager at Toyota Australia where she led the government advocacy program for the introduction of hydrogen fuel cell electric vehicles to Australia. Prior to this she worked for federal and state governments in areas including industry and trade policy.

Claire is passionate about the benefits of hydrogen and fuel cell technologies, and the economic and environmental opportunities for Australia in transitioning to a hydrogen economy. Claire holds a Bachelor of Economics and a Master of Marketing from the University of Tasmania.

Matt Macleod

MANAGER, ADVANCED TECHNOLOGY VEHICLES AND SITE DEVELOPMENT, ADVANCED PLANNING DEPARTMENT, TOYOTA MOTOR CORPORATION AUSTRALIA LIMITED

Matt Macleod is currently the Manager of Advanced Technology Vehicles and Site Development for Toyota Motor Corporation Australia Limited.

For over 13 years as part of Toyota's Quality Engineering team, Matt supported the local implementation and manufacture of vehicles at Altona, Victoria.

In 2014 Matt transferred to Corporate Affairs as a member of the discrete team tasked with reshaping Toyota following manufacturing closure, focusing on New Business Functions and establishing the Altona Centre of Excellence.

Matt has been in the Advanced Planning Group since July 2017 continuing active projects where he is currently leading Toyota Australia's Hydrogen Fuel Cell activities.

Scott Nargar

MANAGER, HYUNDAI FUTURE MOBILITY AND GOVERNMENT RELATIONS, HYUNDAI MOTOR COMPANY

Scott Nargar leads the Hydrogen Fuel Cell Electric Vehicle project and future mobility programs for Hyundai Motor Company Australia.

For the last seven years Scott has been working for Hyundai Motor Company Australia in senior technical management, product planning, environment and Government engagement policy roles.

Scott has over two decades of experience in the motor industry in technical, media, product planning and technology advocacy roles.

At the National Roads and Motorists' Association (NRMA) Scott worked in vehicle inspection, judging and writing on Australia's Best Cars Awards and as a member of the Technical Working Group with the Australasian New Car Assessment Program (ANCAP).

As a passionate proponent of vehicle safety, renewable transport and autonomous vehicle technology, Scott has engaged with many levels of Federal and State Government, as well as policy and academic experts and key industry partners around the world.

Ian Kay

CHIEF FINANCIAL OFFICER, ARENA

Ian Kay is ARENA's Chief Financial Officer and leads ARENA's business development and transactions teams.

Ian's focus is on optimising the use of ARENA's grant money to help proponents secure the sponsor equity, third party equity and project finance debt needed to bring projects to financial close.

Ian possesses 15 years' experience leading investment in infrastructure, development and commercialisation of renewable energy projects at Origin Energy and Macquarie Group. He has particular skill in managing joint venture partnerships and a track record of designing innovative transaction structures.

Ian brings a depth of experience to ARENA and has originated, developed and led projects totalling more than AUD$12 billion in enterprise value and AUD$3.7 billion required equity commitment. He has experience of a broad range of renewable energy projects.

Ian holds a Master of Arts (Hons) in Economic Science from Aberdeen University and is a member of the Institute of Chartered Accountants (England and Wales).

Shaun Gregory

EXECUTIVE VICE PRESIDENT EXPLORATION & TECHNOLOGY, WOODSIDE

Shaun Gregory is passionate about technology and innovation and the role they play in enabling and transforming business.

In his current role as Executive Vice President Exploration & Technology, he oversees Woodside's exploration efforts, technology advancements and concept development for Woodside's growth projects.

Shaun is a member of the Dean's Council for the faculty of Engineering, Computing and Mathematics at the University of Western Australia and is a Board Member of Scitech Western Australia.

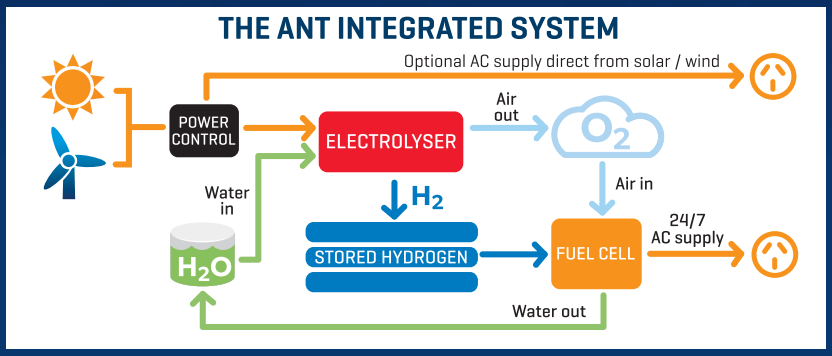
Shaun has a Bachelor of Science (Hons) from the University of Western Australia in Mathematical Geophysics and a Master of Business and Technology from the University of New South Wales.

ANT
ENERGY SOLUTIONS

Creating the hydrogen economy

ANT, Australia's leading hydrogen energy storage innovator, has developed a totally integrated system, combining renewable energy, hydrogen production and dispatchable storage solutions to overcome the intermittency of renewables. The benefits are numerous including zero greenhouse gas emissions, low running costs and power self-reliance.

Renewable energy when and where you need it.



Renewable wind and solar technologies can sometimes provide sufficient electricity, but this is not always reliable.

ANT's system uses excess energy produced by renewables to power an electrolyser which splits water into hydrogen and oxygen.

The hydrogen is stored in tanks for later use when renewables are intermittent.

Hydrogen is then recombined with oxygen in the fuel cell to create base-load electricity on demand.

The only by-product is clean drinking water which can then be re-used to power the electrolyser.

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